

Customer No.: 31561
Application No.: 10/605,237
Docket No.: 9758-US-PA

In The Specification

[0025] Fig. 4 is a perspective view showing various types of rotational junctions according to this invention. Fig. 5 is a perspective view showing various types of rotational junctions having from one to five degrees of freedom of movements according to this invention. According to the embodiment of this invention (refer to Figs. 2, 4 and 5), the rotational mechanism 206 is built using a rotational junction 207. There are a variety of rotational junction designs as shown in Fig. 4. One of the following types of rotational junctions may be selected by the interface apparatus designer, namely: a rotational joint 402, a sliding joint 404, a cylindrical joint 406, a spiral joint 408, a rolling joint 410, a cam-wheel joint 412, ~~a gear-wheel joint, a spiral joint, a cylindrical joint,~~ a ball-and-socket joint 414, ~~or a plane-sliding joint 416, or a gear-wheel joint 418.~~ Moreover, the rotational joint 207 can have one to five degrees of freedom of movements as shown in Fig. 5. Referring to FIG. 5, the device 502, 504 or 506 has one degree of freedom of movement, the device 512, 514, 516, 518 or 520 has two degrees of freedom of movement, and the device 522, 524, 526, 528 or 530 has three degrees of freedom of movement. In addition, the device 532, 534, 536 or 538 has four degrees of freedom of movement, and the device 542 has five degrees of freedom of movement. For example, a designer may select a plane-sliding joint 416 as shown in Fig. 4 to serve as a rotational joint 207. In this case, since the plane-sliding joint 416 has three degrees of freedom of movements (two sliding motions and a rotational

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motion), the rotational mechanism 206 also has a total of three degrees of freedom of movements.

[0026] However, the number of rotational junctions in the interface apparatus is not limited to one but can be two. The components and their structural relationships are similar to the one described in the first embodiment. Fig. 6 is a perspective view showing an interface apparatus with a rotational mechanism (two rotational junctions) according to a second embodiment of this invention. Fig. 7 is a perspective view showing an interface apparatus with rotation mechanism according to the second embodiment of this invention plugged onto a notebook computer. As shown in Figs. 4, 5, 6 and 7, the rotational mechanism 306 of the interface apparatus 300 has two rotational joints 307 and 308 and the rotational joints can have a variety of selections. The rotational joints 307 and 308 can be selected from the list of joints as shown in Fig. 4. In addition, the rotational joints 307 and 308 can have one to five degrees of freedom of movements as shown in Fig. 5. For example, a designer may select a plane-sliding joint 416 having three degrees of freedom of movements (two sliding and one rotational) as shown in Fig. 4 to serve as the first rotational joints. The designer may also choose a spiral joint 408 having two degrees of freedom of movements (a sliding and a rotational) to be the second rotational joint. Consequently, the rotational mechanism 306 has a total of five degrees of freedom of movements, three from the first joint and the two from the second joint.